Assessing the RIP RO Recomp Formula, Part III

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Background / Overview

- This annotated brief represents the third of three LX analytical efforts focused on evaluating the RIP RO recomp formulas for the SecRep Program Management Office (SPMO)
  - Part I: Assessed current formula and described two alternative proposals. Delivered to WIPT, August 2000.
    - Current formula exhibits two fundamental problems:
      - Inaccurate estimation of the number of items on order, and
      - Safety level determination
    - Both alternatives correct problems with current formula. Each performed as well or better than the current formula in simulated tests using standard metrics.
    - One alternative identified as clearly preferable.
  - Part II: Demonstrated differences between current formula and preferred alternative; prepared in response to SPMO request. Delivered to WIPT, December 2000.
  - Part III: Compares current formula and preferred alternative for subset of items identified by SPMO.

What we will address in part III

- A comparison of three methods using RO dollar value and daily performance metrics:
  - The current formula,
  - Recomp quantities validated by RIP managers, and
  - The proposed formula.

- Ability to satisfy direct exchange demands; mount out allowances are not considered.

Project Focus and Methodology

Q1: How does the proposed formula affect RO values and costs?

Methodology: Determine the differences in main float RO quantities and costs based on the three methods.

Q2: How does computing the RO differently affect inventory performance?

Methodology: Use transaction history to determine on-hand and backorder quantities for recomp and proposed formula and compare the results.

Data sources and scope of effort

- SPMO identified 57 components to the LAV-25 (E0947), some of which are common to other LAV variants.

- Evaluated these items using:
  - recomp variables and values from each main float's allowance reports, and
  - daily transaction history from SASSY voucher file to determine daily changes in OHAA stock position.

- Summarized several key metrics resulting from each method.

Formula Recap

Current Formula

$$\frac{RR \times RCT}{30} + \frac{(MFR - RR) \times OST}{30} + SL$$

Proposed Formula

$$\frac{(1-p) \times MFR \times RCT}{30} + \frac{p \times MFR \times OST}{30} + SL$$

Where p is the actual proportion of RIP demands that result in disposal or washout and SL based on a 90% service level.

An example of how we calculated requirements using both formulas

Median OST	Median RCT	Median MFR	Median RR	proportion washed	RCR	OSR	SL	Current formula RO	Validated recomp RO	Proposed formula RO
30	30	2	0	0.059	0.000	2.000	2	4	4	4
30	9	4	3	0.000	0.900	1.000	2	4	5	4
30	43	2	1	0.000	1.433	1.000	3	6	5	5
30	90	2	2	0.000	6.000	0.000	6	12	7	9
30	5	39	37	0.006	6.167	2.000	9	18	16	10
0	0	0	0	0.000	0.000	0.000	0	0	0	0
30	30	2	4	0.000	4.000	-2.000	6	12	7	4
30	4	2	1	0.000	0.133	1.000	2	4	2	2
30	383	5	1	0.000	12.767	4.000	17	34	24	74
30	5	13	12	0.011	2.000	1.000	3	6	6	5
30	6	9	12	0.007	2.400	-3.000	6	12	5	4

Unusually high estimate due to excessive median RCT

Example of how (MFR-RR) in current formula can result in a **negative** number

The proposed formula lowers RO cost

Method	RO Cost	Percentage of current
Current	$9,035,379.74	100%
Recomp	$6,106,671.09	68%
Proposed	$6,175,977.36	68%

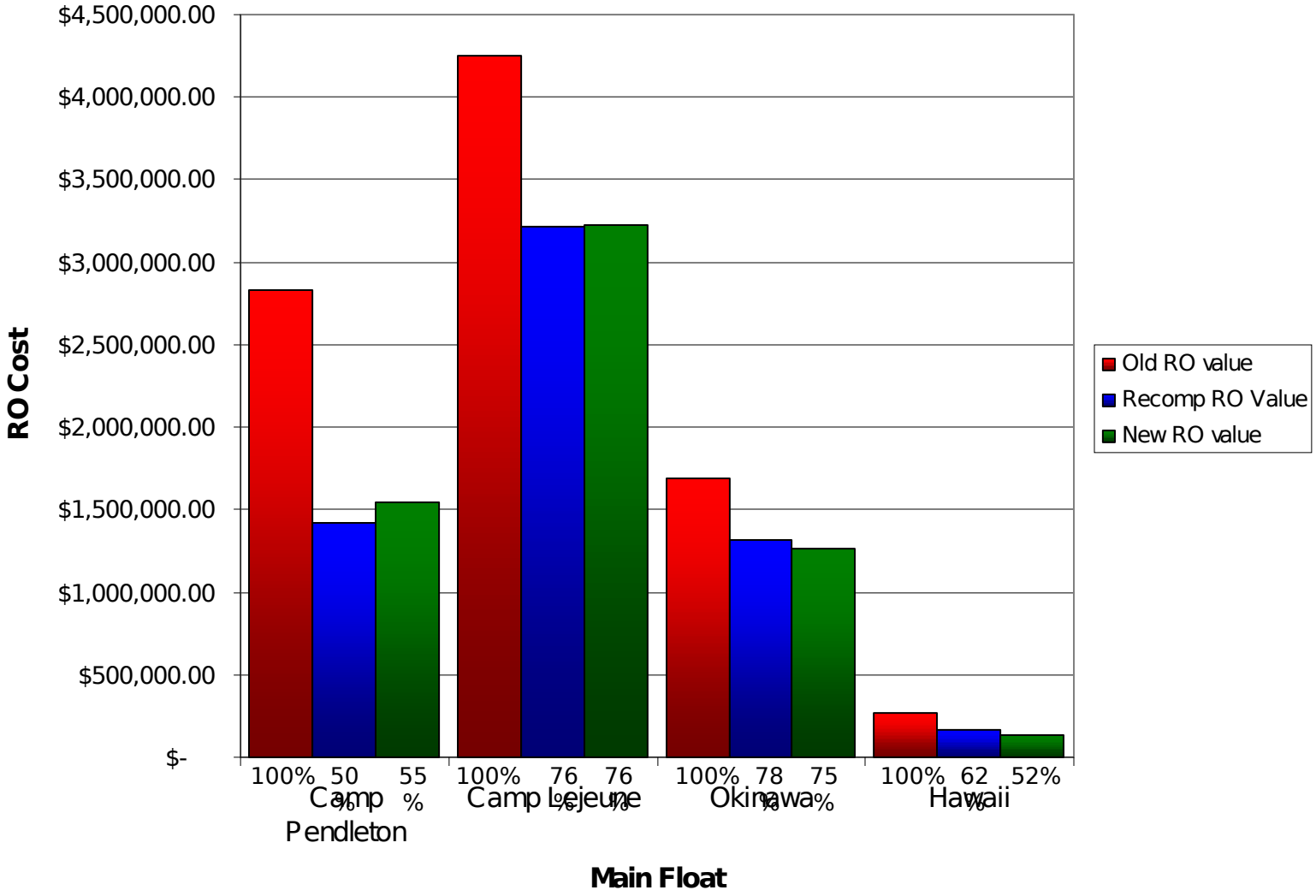
RIP validated recomp values and proposed Formula results are remarkably similar. . . Automated formula arrives at result much faster.

Method	Avg OH*	Avg OH Value*	Avg BO	Avg BO Value
Current	n/a	n/a	n/a	n/a
Recomp	570.21	$7,777,076.15	15.67	$ 178,880.78
Proposed	545.88	$ 7,423,407.98	14.06	$ 142,552.33

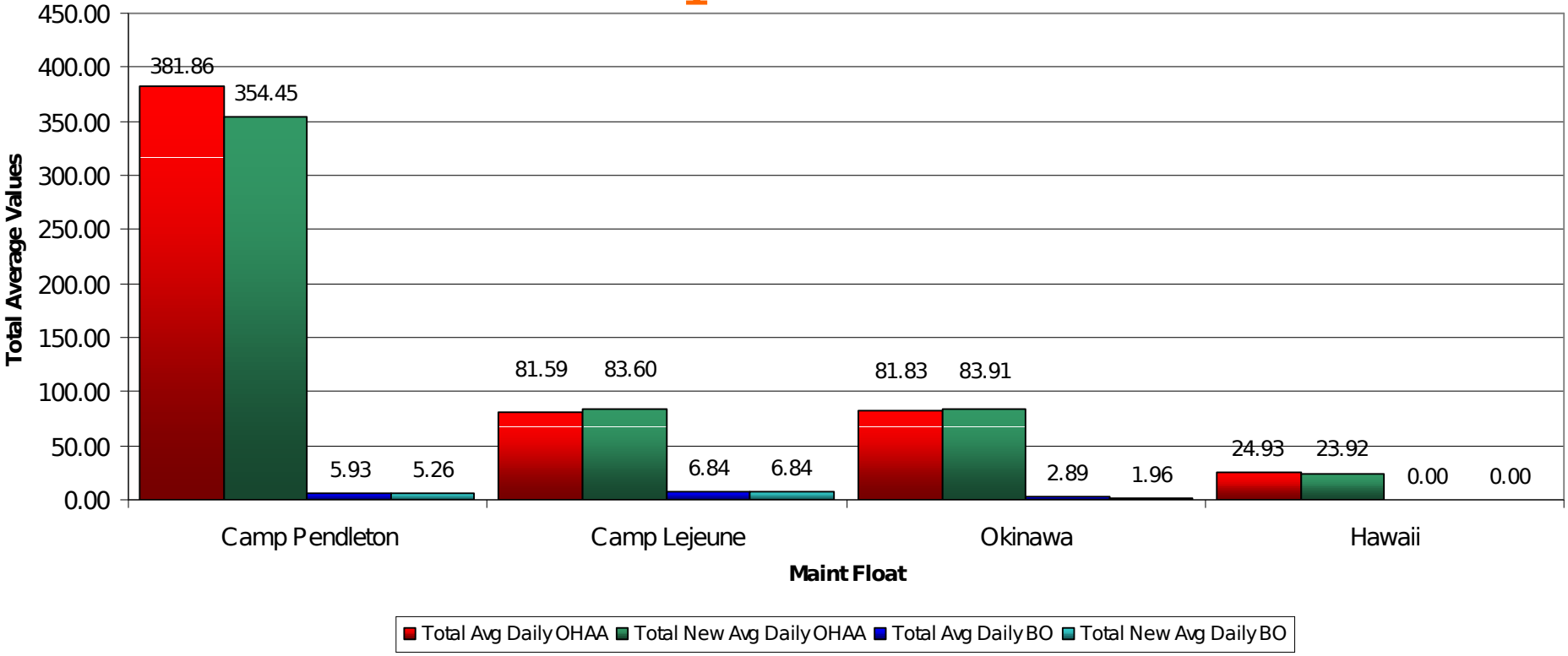
Again, proposed formula results similar to RIP validated results

* Inflated values due to methodology. See notes.

RIP Managers' recomp and the proposed formula both reduce RO costs



Proposed formula results in very similar performance to the latest RIP recomp values *



* Note: The Recomp Daily OHAA and BO numbers based on Recomp RO quantities. The Avg New Daily OH and BO quantities are based on the difference in RO calculated from the proposed formula.

Conclusions

- The proposed formula calculates a lower RO than the current formula with similar performance to the requirements determined by the RIP managers.

- RIP manager validation effort is labor and time intensive; the proposed formula can save these valuable resources.

- This analysis employed one service level for the entire set of NSNs; in reality, the desired service level will likely vary NSN based on considerations such availability and criticality. Varying the service level by NSN in the proposed formula is easy.

Saved Rounds

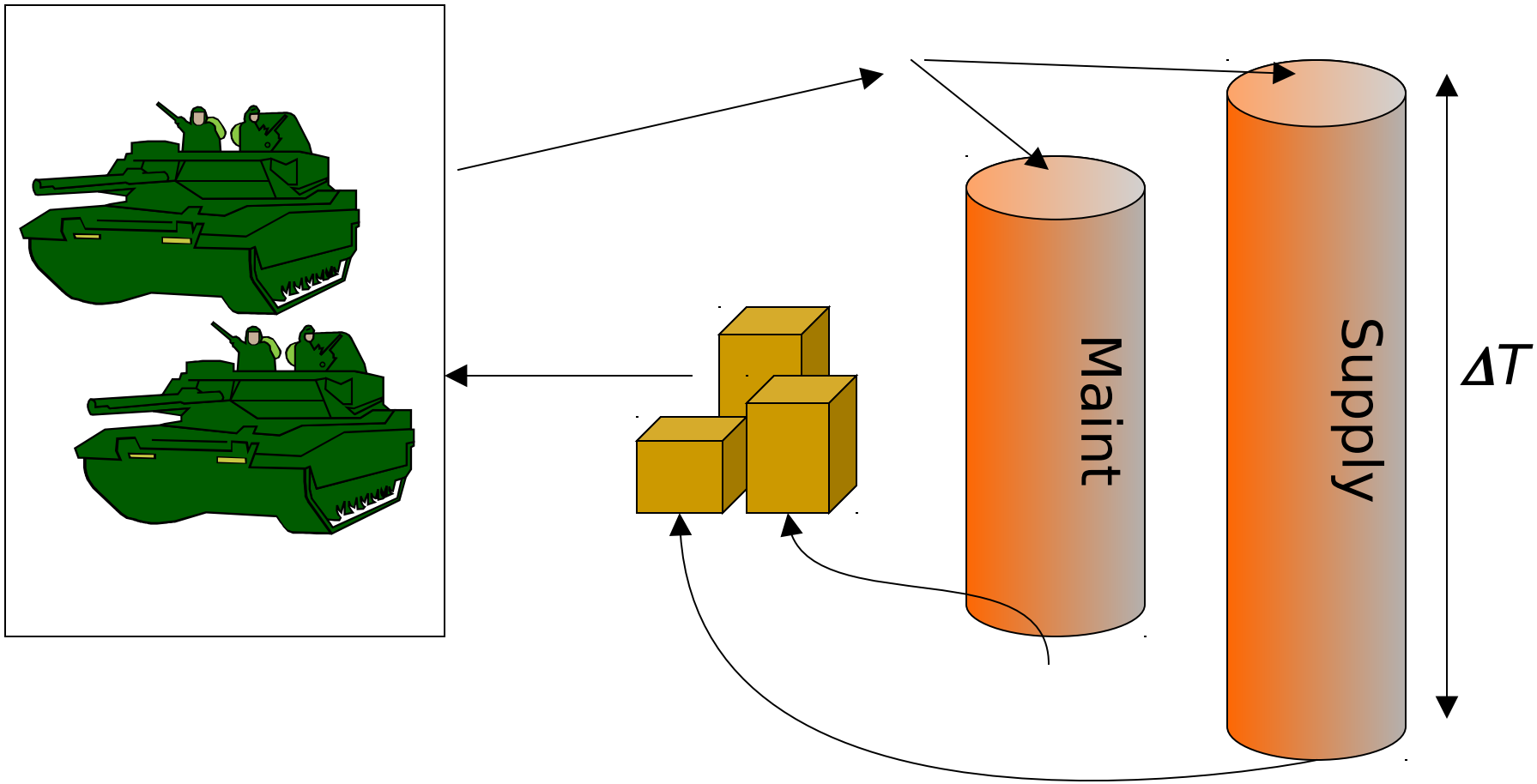
- As always, the recomp is only as good as the data you use.

- Analytical efforts like this are data intensive. LX appreciates the assistance provided by SPMO in obtaining the required data. Capt Paige, MSgt Schauer, and Mr. Mark Harris were particularly helpful.

Backup Slides

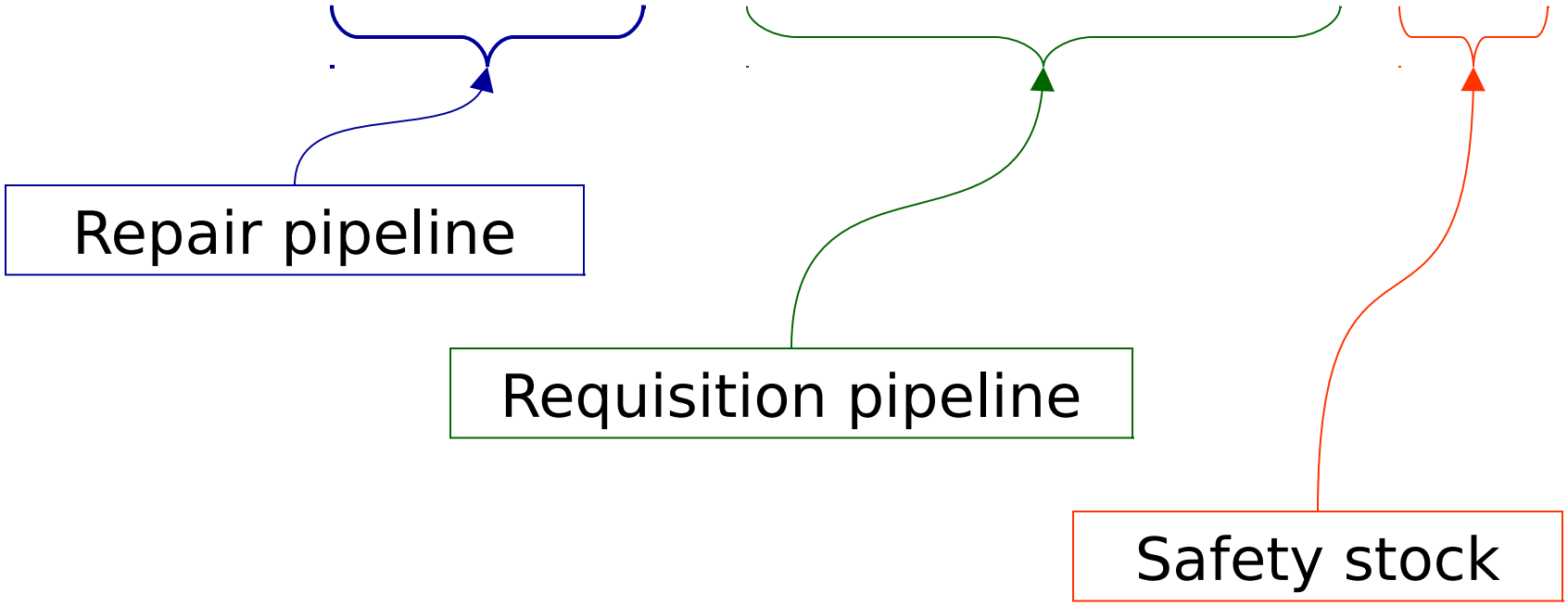
- RO is based on pipeline stock
- Current formula tries to approximate pipeline stock
- Hidden assumptions we should recognize

RO is based on pipeline stock



Current formula tries to approximate pipeline stock

$$RO = \frac{RR \times RCT}{30} + \frac{(MFR - RR) \times OST}{30} + SL$$



Hidden assumptions we should recognize

- Constant arrival rate at RIP (LD assets especially won't pass that test!)
- Unlimited supplier capacity
  - OST does not depend on any outstanding orders
- Unlimited capacity of repair shops
  - RCT does not depend on number in work
- Simplifying assumptions about OST and RCT distributions that do not hold in all cases